

FIRST RECORD FOR AUSTRALIA OF THE WOOD-INHABITING FUNGUS *HEMIMYCENA* *CEPHALOTRICHA*: FROM URBAN BUSHLAND IN PERTH, WESTERN AUSTRALIA

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ABSTRACT

The diminutive fungus *Hemimycena cephalotricha* is reported for the first time from Australia: based on specimens inhabiting rotting wood of *Melaleuca huegelii* at Bold Park, an urban bushland in Perth, Western Australia. *H. cephalotricha* is distinguished from other species of *Hemimycena*, including the two other species recorded in Australia, by the combination of having capitate cystidia and strongly limoniform or amygdaliform spores. Under moist conditions the fruit bodies of *H. cephalotricha* are quite striking when observed under a hand lens as they are bejewelled with abundant water droplets. The droplets form among abundant cystidia on the pileus and stipe. Under drier conditions droplets are absent and then the fruit bodies have a pruinose or pubescent appearance.

INTRODUCTION

A bewildering diversity of very small, white, mycenoid and omphaloid fungi inhabit rotting wood in natural woodlands of Australia. Many of them are represented in urban bushlands of Perth in Western Australia. Because of their minute size and superficial similarity to each other these diminutive fungi present a challenge to record, collect and identify in bio-

diversity surveys. This article outlines the identity of one such fungus, *Hemimycena cephalotricha*, which was initially designated as an "undetermined agaric" in recent surveys of fungi in urban bushland at Bold Park in Perth (Bougher 2009).

Hemimycena species usually have very small, white fruit bodies that mostly resemble delicate species of *Mycena*, *Omphalina* or *Lichenomphalia*. Indeed many of

the species of *Hemimycena* were once widely accepted within the genus *Mycena* (Antonín and Noordeloos 2004). Unlike the majority of *Mycena* species however, they have inamyloid spores and no part of their fruit body is dextrinoid or amyloid (Antonín and Noordeloos 2004). Their stipe often has distinct basal mycelium that may also extend over the surrounding substrate. *Hemimycena* species often have abundant cystidia on their pileus and stipe. In moist conditions the fruit bodies of some species may be covered with water droplets. Upon drying out the surfaces may appear pruinose or pubescent under a hand lens.

Because *Hemimycena* species are usually very small, they are easily overlooked. There are about 50 species of *Hemimycena* known world-wide (Kirk *et al.* 2008). All of the species are likely to be predominantly saprotrophic. They mostly inhabit rotting plant material such as wood and leaves. Only two species of *Hemimycena* have been recorded in Australia to date (May and Wood 1997, Lepp 2004): *Hemimycena crispula* (Qué.) Singer collected in 1976 from Wanneroo in Western Australia by visiting Dutch mycologist Jasper Daams, and *Hemimycena tortuosa* (P.D. Orton) Redhead recently described from a garden in Canberra (Lepp 2004).

TAXONOMIC DESCRIPTION

Figures 1–4

Pileus 1–3 mm diam., thin-fleshed,

hemispherical or convex then broadening to flat-convex with a strongly incurved or slightly involute margin covered with minute water droplets in moist conditions but pubescent in drier conditions due to densely arranged fine white hairs. Margin not grooved or translucent-striate. Entirely white becoming cream and then grading to pale yellowish-brown (near Methuen 4-A4) at the centre when mature, not bruising. *Lamellae* broadly adnate to briefly decurrent, white at first then pale yellowish-brown (near Methuen 4-A4), thick, distant, edge white, pruinose, rarely anastomosed, one lamellulae between each pair of lamellae, L = 5–7, l = 4–6, each lamellula less than half the height and length of the lamellae. *Stipe* 2–5 x 0.3–0.5 mm, central or eccentric, cylindric, base unswollen and not inserted in the substrate, with tomentose white mycelium at extreme base and extending over the adjacent substrate. White, pearly or semi-translucent. Surface with abundant water droplets adhering in moist conditions but pubescent in drier conditions due to densely arranged fine white hairs (similar to those on the pileus). *Odour* not distinctive. *Taste* not tested. *Spore deposit* pale cream, with a faint lemon tinge.

Basidiospores (6.3) 6.4–7.8 (8.0) x (3.7) 4.0–4.9 (5.3) μm , mean profile 7.03 x 4.47 μm , mean face view 7.07 x 4.38 μm , mean L/B ratio profile 1.57, mean L/B ratio face view 1.61 (n = 30). Hyaline and



Figure 1. Immature fruit bodies of *Hemimycena cephalotricha* from Bold Park. The pilei (caps) of these specimens are only about 1 to 1.5 mm wide at this stage. Note the absence of pigment compared to the mature fruit bodies shown in Figure 2.

with a single oil bubble in 3% KOH or water, inamyloid, non-dextrinoid. Limoniform or amygdaliform, asymmetrical in profile, smooth, thin-walled. Hilar appendix prominent, up to about 1.5 mm long, tapering. *Basidia* 18–21 x 5.5–7 μm , clavate, hyaline, thin-walled, 4-spored. *Lamellae trama* parallel, clamped hyphae 3–15 μm broad, non-dextrinoid. *Subhymenium* hyphae similar to trama. *Pleurocystidia* absent. *Cheilocystidia* scattered to abundant, 25–32 x 9–19 μm , capitate with cylindrical stalk 2–

3 μm wide, thin-walled, hyaline in KOH or water. Clamp connections present. *Pileipellis* a cutis of thin-walled, sometimes diverticulate, clamped hyphae 2–12 μm broad. *Pileocystidia* abundant, 25–55 μm long with a cylindrical, sinuate, contorted, or submoniliform neck 2–3 μm wide. Apex variable but predominantly swollen or capitate up to 9 μm wide, sometimes unswollen especially cystidia near to the stipe apex. Base often with diverticulate protuberances. Hyaline in 3% KOH or water,



Figure 2. Mature fruit bodies of *Hemimycena cephalotricha* from Bold Park. The pilei (caps) of these specimens are about 2.5 to 3 mm wide at this stage. Note the brownish pigmentation, and the abundance of water droplets on the pileus (cap) and stipe (stem) but their absence on the lamellae (gills).



Figure 3. Fruit bodies of *Hemimycena cephalotricha* from Bold Park in drier conditions than those depicted in Figures 1 and 2. Note the absence of water droplets and the exposure of abundant whitish cystidia on the edge of the lamellae (gills), the stipe (stem) and the pileus (cap) which now appear densely pruinose or pubescent.

sometimes thick-walled but mainly thin-walled. Clamp connections present. *Caulocystidia* abundant and crowded on majority of the stipe, 25–65 μm long with a cylindrical, sinuate, contorted, or submoniliform neck 2–3 μm wide. Apex variable but predominantly swollen or capitate up to 7 μm wide, sometimes unswollen especially cystidia near to the stipe apex. Diverticulate protuberances often near base. Hyaline in KOH or water, sometimes with thick wall

but mainly thin-walled. Clamp connections present. *Clamp connections* present in all tissues.

Specimens examined – Western Australia, Perth, Bold Park, base at northern side of Reabold Hill (31° 56' 16.7" S, 115° 46' 46.0" E) – on moist, well-rotted wood of *Melaleuca huegelii* Endl., in shrubland of *Acacia* and paperbark (Bold Park vegetation type 5b), 25 June 2009, coll. N. L. Bougher and P. Davison BOUGHER 540 (PERTH).

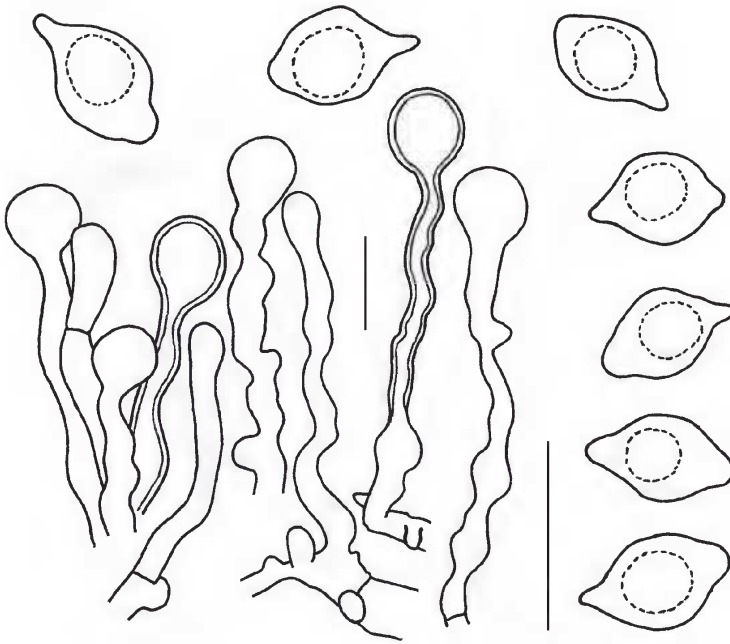


Figure 4. Pileocystidia and spores of *Hemimycena cephalotricha* from Bold Park. Note the thickened walls of some pileocystidia, and the short protuberances near the base of some of them. Scale bars = 10 μ m.

DISCUSSION

Hemimycena cephalotricha is distinguishable from all other species of *Hemimycena* by having capitate cystidia and strongly limoniform to amygdaliform spores (Figure 4). *H. cephalotricha* closely resembles *H. tortuosa* – one of the two other species of *Hemimycena* recorded so far in Australia. Both species can be densely covered by water droplets formed among capitate cystidia. However *H. tortuosa* differs from *H. cephalotricha* by having fusoid spores, pileocystidia and caulocystidia with spirally-twisted necks, and acute cheilocystidia (see Lepp 2004, Antonín and

Noordeloos 2004). The other species of *Hemimycena* recorded for Australia – *H. crispula* – is readily distinguished from *H. cephalotricha* as it has reduced lamellae that do not reach the margin of the pileus, lacks cheilocystidia, and has setiform caulocystidia (see Antonín and Noordeloos 2004).

Within the genus *Hemimycena*, *H. cephalotricha* is placed in the Section *Hemimycena* together with other species of the genus which particularly resemble delicate species of *Mycena* (Antonín and Noordeloos 2004). Like *Mycena*, these species have a convex cap expanding to almost applanate, and well developed

gills. However *H. cephalotricha* differs from some of the other species of *Hemimycena* Sect. *Hemimycena* by having a slightly involute pileal margin rather than decurved or plane, and by having thick and well-spaced lamellae rather than more closely-spaced and narrower lamellae (Antonín and Noordeloos 2004).

Hemimycena cephalotricha has been recorded from many other parts of the world, including New Zealand. According to Antonín and Noordeloos (2004) it is considered to be widespread in Europe and North America but never common. The morphological characteristics of *H. cephalotricha* from Bold Park closely match those of specimens described from elsewhere. However, it is interesting to note that the Bold Park specimens become well pigmented as they attain maturity (yellowish-brown, near Methuen 4-A4). Such pigmentation previously has not been attributed to this species, e.g. pileus “white, often with slight cream tinge”, lamellae “white” (Antonín and Noordeloos 2004); cap “white”, gills “white then slightly cream-colour or faintly yellowish” (Watling and Turnbull 1998); pileus and lamellae “white” (Malysheva and Morozova 2009). Other collections of *H. cephalotricha* growing on a range of Australian native plant substrates will need to be examined to determine if well-pigmented specimens occur widely in Australia.

Hemimycena cephalotricha is quite

striking when observed under a hand lens as the pileus and stipe are often bejewelled with refractive water droplets (Figures 1, 2). The droplets occur among the apices of abundant mainly capitate caulocystidia and pileocystidia (Figure 4). It is interesting to note that the lamellae do not usually have such a covering of water droplets, even though the lamellae too have abundant capitate cystidia. When in drier conditions the fruit bodies appear to be covered with a white pubescence, again due to the abundant cystidia (Figure 3).

Bold Park, where this first Australian record of *H. cephalotricha* was observed, is a large area (437 ha) of natural bushland within the metropolitan area of Perth, Western Australia. Bold Park is a significant refuge for many native plants and animals (BGPA 2006), and over 400 species of fungi have been recorded since fungi surveys commenced there in 1999 (Bougher 2009). Many of the fungi species occurring at Bold Park and in other urban bushlands of Perth are diminutive-sized fungi similar in general appearance to *H. cephalotricha* and most of them are awaiting detailed taxonomic study to determine their identity.

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REFERENCES

- ANTONÍN, V. and NOODELOOS, M.E. 2004. *A monograph of the genera Hemimycena, Delicatula, Fayodia, Gamundia, Myxomphalia, Resinomycena, Rickenella, and Xeromphalina in Europe*. IHW-Verlag, Eching, Germany.
- BOTANIC GARDENS AND PARKS AUTHORITY 2006. *Bold Park Management Plan 2006–2011*. Botanic Gardens and Parks Authority, Perth, Western Australia.
- BOUGHER, N.L. 2009. *Fungi survey – Bold Park 2009*. Consultancy Report for the Botanic Gardens and Parks Authority (BGPA). Client Report Department of Environment and Conservation, and Perth Urban Bushland Fungi Project.
- KIRK, P.M., CANNON, P.F., MINTER, D.W. and STALPERS, J.A. 2008. *Ainsworth & Bisby's dictionary of the fungi*. 10th ed. CAB International, Wallingford, United Kingdom.
- LEPP, H. 2004. *Hemimycena tortuosa*, newly recorded from Australia. *Australasian Mycologist* **23**: 105–107.
- MALYSHEVA, E.F. and MOROZOVA, O.V. 2009. Notes on *Hemimycena* from European Russia. *Czech Mycology* **61**: 27–71.
- MAY, T.W. and WOOD, A.E. 1997. *Fungi of Australia Vol. 2A. Catalogue and Bibliography of Australian Macrofungi 1. Basidiomycota p.p.* Australian Biological Resources Study, Canberra, Australian Capital Territory.
- WATLING, R. and TURNBULL, E. 1998. *British Fungus Flora: Agarics and Boleti. 8/ Cantharellaceae, Gomphaceae, and amyloid-spored and xeruloid members of Tricholomataceae (excl. Mycena)*. Royal Botanic Gardens, Edinburgh, United Kingdom.